APPARATUS FOR CASTING BLANK FOR SUPERPLASTIC FORMING AND TAKING OUT MOLDING

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Abstract

PROBLEM TO BE SOLVED: To provide a technique that can reduce a loss of thermal energy and can raise productivity in superplastic forming.
SOLUTION: Blow molding is carried out with a left forming die 60 of Figure (a), and a next blank 71 is hung on a right arm member 33. In Figure (b), immediately after the blow molding has been finished, an upper die 62 is raised as indicated by arrows (4), the arm member 33 is entered into the forming die 60 as indicated by an arrow (5), and the blank 71 is dropped on a lower die 64 (arrows (6) in Figure (c)). Then a formed part 72 sticks to the upper die 62. Thus, a coolant gas is sprayed on a lower surface of the formed part 72 through balloon nozzles 34. The formed part 72 contracts with this forced cooling and is off the upper die 62, and is mounted on molding pedestal parts 35 of the arm member 33 (an arrow (7). As a result, cycle time can be shortened and the next blow molding becomes possible to be started before the forming die 60 gets cold.

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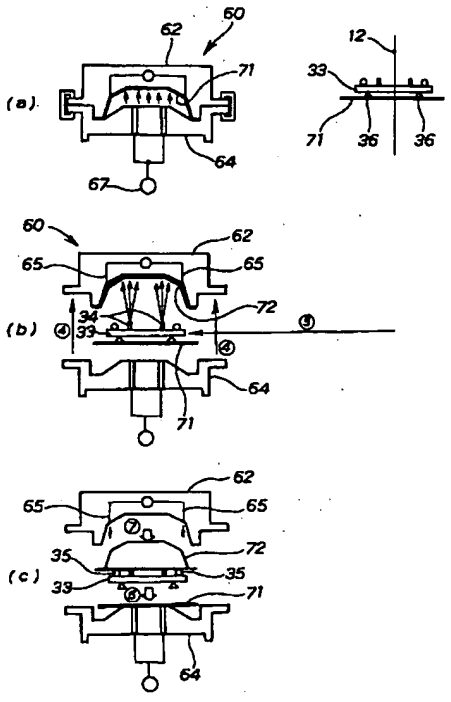
(54)【発明の名称】　超塑性成形用ブランク材の投入兼成形品の取出し装置

(57)【要約】
【課題】　超塑性成形において、熱エネルギーの損失を抑えることができると共に生産性を高めることのできる技術を提供する。
【解決手段】　図（ａ）の左の成形金型６０でブロー成形を実施し、右のアーム部材３３に次のブランク材７１を吊り下げておく。成形が終了したら直ちに（ｂ）において、矢印④の通りに上型６２を上げ、矢印⑤の通りにアーム部材３３を成形金型６０内に進入させ、下型６４にブランク材７１を落下させる（次図（ｃ）の矢印⑥）。一方、上型６２には成形品７２が貼り付いている。そこで、吹出しノズル３４，３４から冷却ガスを成形品７２の下面に吹き付ける。この強制冷却により成形品７２は縮んで上型６２から外れ、アーム部材３３の成形品載せ部３５，３５に載る（矢印⑦）。
【効果】　サイクルタイムを短縮することができたと共に、金型が冷えぬうちに次のブロー成形を開始することができるようになった。



【特許請求の範囲】
【請求項１】　成形面を設けた上型と成形ガス吹込み口を備えた下型とからなる超塑性成形金型にブランク材を挟み、下型側から吹込んだガスの圧力でブランク材を上型側へブロー成形する形式の超塑性成形金型に、ブランク材を投入するとともに成形品を取出す超塑性成形用ブランク材の投入兼成形品の取出し装置であって、
この装置は、超塑性成形金型から離れた所に設けた待機位置から超塑性成形金型まで往復する走行台車と、この走行台車に設けたアーム部材と、前記成形面に嵌まった成形品を冷却するために前記アーム部材に設けた冷却ガスの吹出しノズルと、成形品を載せるために前記アーム部材に設けた成形品載せ部と、ブランク材を吊り下げるために前記アーム部材に設けたブランク材吊り機構と、からなることを特徴とする超塑性成形用ブランク材の投入兼成形品の取出し装置。
【請求項２】　前記ブランク材吊り機構は、真空吸着カップであることを特徴とする請求項１記載の超塑性成形用ブランク材の投入兼成形品の取出し装置。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】本発明は、超塑性成形金型へブランク材を投入し、同金型から超塑性成形品を取出す超塑性成形用ブランク材の投入兼成形品の取出し装置に関する。なお、本書において、「型組み」は下型に上型を重ねる（又は一方の型に他方の型を重ねる）ことをいい、「型締め」は上下型（又は一方・他方の型）が分離しないように型同士をクランプ等で締付けることをいう。
【０００２】
【従来の技術】金属材料を一定の条件の下に塑性加工を施すと、８００～１０００％もの極めて大きな伸びを出現させることができる。この現象を「超塑性」と呼び、この超塑性は粒界すべり現象によるものであると説明されている。
【０００３】例えば特開平７－２６５９６６号公報「超塑性成形装置」には、コンパクトな装置が記載されている。この装置の概要を次図で説明する。なお、符号は新たに振り直した。図８（ａ），（ｂ）は改良された従来の超塑性成形装置の構成図兼作用説明図である。（ａ）に示す通り、成形型１００は、下右型１０１、下左型１０２、上型１０３からなる三分割型であり、下右型１０１と下左型１０２との間にキャビティ１０４を有し、上型１０３に給気管１０６を有する。１０７…（…は複数を示す。以下同様。）はヒータ、１０８…はクランプである。そして、予備成形した金属板１１０を型内に封じ込め、ヒータ１０７…で所定温度に暖めると共に給気管１０６から吹込んだガスの圧力で想像線で示すように膨らませる。すなわち、ブロー成形を実施する。
【０００４】（ｂ）において、矢印①の通りに上型１０３を上げ、矢印②の通りに左下型１０２を左へ移動することにより型開きを実施し、矢印③の通りに成形品１１１を取出す。
【０００５】しかし、上述の改良された従来の超塑性成形装置では次の課題がある。矢印②の通りに、下左型１０２を横移動した結果、下右型１０１並びに下左型１０２は大気で急激に冷却され、低温になる。この結果、次のブロー成形では下右型１０１並びに下左型１０２を所定の温度まで暖めるのに多くの熱エネルギーが必要となり、エネルギーの有効利用の点で課題が残る。さらには、下型を左右に分割したために、型構造が複雑になり、型製造コストが嵩む。
【０００６】型製造コストを低減するために下型を左右に分割しなければよい。上下型のみで塑性加工を実施する例を次に説明する。図９（ａ）～（ｃ）は別の従来の超塑性成形装置の作用説明図である。
（ａ）：レール１２０上を走行する走行台車１２１に下型１２２を載せ、この下型１２２に成形凹部１２３を形成しておき、この成形凹面１２３にブランク材１２４を被せ、その上から上型１２５を被せる如くに型組みする。１２６，１２６はクランプである。
（ｂ）：加圧管１２７から高圧流体、例えば圧縮空気を下向きに吹込む。この流体の圧力でブランク材１２４を所望の形状に窪ませる。
【０００７】（ｃ）：１２８を成形位置、１２９を待機位置と呼ぶ。成形位置１２８にて、成形後に上型１２５を上げ、次に下型１２２を走行台車１２１の作用で図右の待機位置１２９へ移動する。待機位置１２９で下型１２２から成形品１３０を取出す。次に、下型１２２に新たなブランク材１２４を載せ、この下型１２２を想像線の位置、即ち成形位置１２８に戻し、次のブロー成形に備える。
【０００８】
【発明が解決しようとする課題】しかし、図９の超塑性成形装置においては下型１２２を成形位置１２８から待機位置１２９へ引出すため、下型１２２の移動に時間が掛かり、生産性が低くなると共に、下型１２２が冷えてしまう。そのため、熱エネルギーの損失は免れない。
【０００９】ところで、成形品１３０を取出すに当り、成形品１３０が低温であれば成形品１３０の取扱いが容易になる。同時に、下型１２２及び成形品１３０を冷やすことで成形品１３０が下型１２２から離型し易くなる。そのため、従来は成形品１３０や下型１２２を冷却することに意味がある。しかし、この様に冷却することが生産性の低下や熱エネルギーの損失を招くことになり、このままでは経済的な損失は免れない。そこで、本発明の目的は熱エネルギーの損失を抑えることができると共に生産性を高めることのできる技術を提供することにある。
【００１０】

【課題を解決するための手段】上記目的を達成するために請求項1は、成形面を設けた上型と成形ガス吹込み口を備えた下型とからなる超塑性成形金型にブランク材を挟み、下型側から吹込んだガスの圧力でブランク材を上型側へブロー成形する形式の超塑性成形金型に、ブランク材を投入するとともに成形品を取出す超塑性成形用ブランク材の投入兼成形品の取出し装置であって、この装置は、超塑性成形金型から離れた所に設けた待機位置から超塑性成形金型まで往復する走行台車と、この走行台車に昇降可能に取付けたアーム部材と、成形面に嵌まった成形品を冷却するために前記アーム部材に設けた冷却ガスの吹出しノズルと、成形品を載せるためにアーム部材に設けた成形品載せ部と、ブランク材を吊り下げるためにアーム部材に設けたブランク材吊り機構と、からなることを特徴とする。

【0011】成形後に上型を上げてそれの下にアーム部材を差し入れる。アーム部材には予めブランク材を吊り下げておき、このブランク材を下型へ投入する。一方、上型に貼り付いた状態の成形品へ吹出しノズルから冷却ガスを吹き付ける。成形品は強制冷却により収縮するから上型から分離し、アーム部材に落下する。アーム部材を待機位置へ横移動することで金型外へ成形品を取出す。以降、上型を下型に被せて次のブロー成形を実施すればよい。

【0012】請求項2では、ブランク材吊り機構を真空吸着カップとした。ブランク材吊り機構は、磁気吸着マグネットや吊り鉤でもよいが、マグネットであれば非磁性体は吊り上げることができず、取扱えるブランク材の材質に制限がある。また、吊り鉤であれば、ブランク材に傷をつける虞れがある。この点、真空吸着カップであれば、ブランク材に傷をつける心配がなく且つブランク材の材質は問わないので、使い勝手が極めてよくなる。

【0013】

【発明の実施の形態】本発明の実施の形態を添付図に基づいて以下に説明する。なお、図面は符号の向きに見るものとする。また、以下の説明中「投入」は金型へブランク材を投入すること、「取出し」は金型から成形品を取出すことを言う。図1は本発明に係る超塑性成形装置の平面図であり、超塑性成形装置10は、想像線で示す超塑性成形金型60と、この成形金型60を囲う加熱炉11と、この加熱炉11の外に設けた待機位置12まで延ばしたレール部材31と、このレール部材31上を待機位置12から成形金型60まで往復移動する走行台車32及びこの走行台車32に設けたアーム部材33を主体とした超塑性成形用ブランク材の投入兼成形品の取出し装置30（以下、「投入兼取出し装置30」と略記する。）と、からなる。この投入兼取出し装置30を次に詳しく説明する。

【0014】図2は図1の2矢視図であり、投入兼取出し装置30は、レール部材31上を移動する走行台車32と、この走行台車32に昇降可能に取付けたアーム部材33と、次図で詳しく説明するがアーム部材33に設けた冷却ガスの吹出しノズル34，34と、成形品を載せる成形品載せ部35，35と、ブランク吊り機構としての真空吸着カップ36，36とからなる。37は昇降シリンダであり、この昇降シリンダ37の作用で前記アーム部材33を任意に上げ下げすることができる。

【0015】図3は本発明に係る投入兼取出し装置のアーム部材斜視図であり、アーム部材33は2本の縦ビーム41，41に前後のクロスビーム42，43を渡してなる井桁40を主要部材とし、この井桁40のクロスビーム42，43にアングルブラケット44…、ガイドプレート45…及び円柱状の受け座46…からなる成形品載せ部35…（合計4組）を取付け、下降中の成形品（図示せず）をガイドプレート45…でガイドしつつ受け座46…に載せる様にし、また、縦ビーム41，41内面に沿ってガスパイプ47，47を這わせ、これらのガスパイプ47，47から吹出しノズル34…を分岐して上へガスを吹出すことができるようにし、さらに又、縦ビーム41，41外面に沿わせたフランジ48，48に真空吸着カップ36…を吊り下げた構造のものである。なお、井桁40は軽量の割に曲げ剛性が大きい。そこで、アーム部材33の軽量化を図ることができる。

【0016】図4は図3の4－4線断面図であり、クロスビーム43、受け座46，46、縦ビーム41，41、ガスパイプ47，47、吹出しノズル34，34、フランジ48，48、真空吸着カップ36，36の取付位置、特に高さ関係を示すと共に、第1ブロア51で発生した冷却用エアをパイプ52、ガスパイプ47，47を介して吹出しノズル34，34から吹出すようにしたこと、及びパイプ54、真空発生器55にて真空吸着カップ36…を真空に保つようにしたことを示す。真空発生器55は汎用真空ポンプ又は安価なエジェクターが適当である。

【0017】図5は本発明で使用する超塑性成形金型の断面図であり、この成形金型60は、成形面61を備えた上型62と、成形ガス吹込み口63，63を備えた下型64とからなり、上型62には更に成形品を冷却すると共に成形品を離型させる作用をなすエアブロー通路65，65を備え、エアブロー通路65，65へ第2ブロア66でエアを送り、又、成形ガス吹込み口63，63へ高圧ガス発生器67で高圧ガスを送るようにしたものである。高圧ガス発生器67はエアコンプレッサが好適であるが、ガスボンベであってもよい。

【0018】以上に述べた投入兼取出し装置の作用を図6，7を用いて説明する。図6（a）～（c）は投入兼取出し装置の作用説明図（その1）である。（a）の図左の成形金型60では、下型64側から吹込んだガスの圧力でブランク材71を上型62側へ膨出させ、また図

右の待機位置１２ではアーム部材３３に真空吸着カップ３６，３６にて次のブランク材７１を吊り下げている様子を示す。

【００１９】成形が終了したら直ちに（ｂ）において、矢印④の通りに上型６２を上げ、矢印⑤の通りにアーム部材３３を成形金型６０内に進入させ、下型６４にブランク材７１を落下させる（次図（ｃ）の矢印⑥）。一方、上型６２には成形品７２が貼り付いている。そこで、吹出しノズル３４，３４から冷却ガスとしてのエアを成形品７２の下面に吹き付ける。同時に又は前後して上型６２内のエアブロー通路６５，６５からエアを成形品７２の上面に吹き付ける。

【００２０】（ｃ）において、先に述べた通りにブランク材７１を下型６４に載せ、一方では、成形品７２を冷却する。すると、成形品７２は縮んで上型６２から外れやすくなり、上型６２内のエアブロー通路６５，６５からのエアブローにより、短時間のうちに成形品７２は上型６２から離れて落下し、アーム部材３３の成形品載せ部３５，３５に載る（矢印⑦）。

【００２１】図７（ａ），（ｂ）は投入兼取出し装置の作用説明図（その２）である。（ａ）において、アーム部材３３を矢印⑧の通りに、待機位置１２まで移動する。次に矢印⑨の通りに上型６２を下げて、型合せを実施する。（ｂ）において、クランプ７３，７３で型締めしたのち、ブロー成形を開始する。一方、待機位置１２では、図示せぬ手段又は人手にて、成形品７２を外しつつ新たなブランク材７１を吸着させる。これで、図６（ａ）に戻り、１サイクルが終了する。なお、説明は省いたが、前記アーム部材３３を適宜上下させることは差支えない。

【００２２】図６，７から明らかな如く、成形品７２を強制冷却して離型を促すようにしたので、上型６２並びに下型６４が冷える前に次のブロー成形を開始することができる。この結果、熱エネルギーの損失を抑えることができると共に１サイクルの所要時間を短縮することができ、生産性を向上させることができる。

【００２３】尚、請求項１においては、ブランク材吊り機構は、吊りマグネット（リフティングマグネット）、吊り鈎であってもよい。しかし、真空吸着カップであれば、磁性体、非磁性体の何れをも吊り上げることができ且つブランク材に傷をつける虞れもない。また、実施例では下型を静止させ、上型を昇降するようにしたが、逆に上型を静止させ、下型を昇降するようにしてもよい。

【００２４】

【発明の効果】本発明は上記構成により次の効果を発揮する。請求項１は、アーム部材でブランク材を吊り下げて下型へ投入すると共に、同じアーム部材で上型から落下する成形品を受取るようにしたこと、上型に貼り付いている成形品を、冷却ガスで強制冷却することで迅速に離型させるようにしたことを特徴とし、この結果、サイクルタイムを短縮することができると共に、金型が冷えぬうちに次のブロー成形を開始することができるようになった。

【００２５】即ち、アーム部材でブランク材を金型へ投入し、アーム部材で金型から成形品を取出すようにしたので、投入、取出しを素早く実施することで、金型が冷えぬうちに次のブロー成形を開始することができ、熱エネルギーの損失を抑えることができると共に、サイクルタイムを容易に短縮できるので生産性を大いに高めることができる。

【００２６】請求項２では、ブランク材吊り機構を真空吸着カップとした。ブランク材吊り機構は、磁気吸着マグネットや吊り鈎でもよいが、マグネットであれば非磁性体は吊り上げることができず、取扱えるブランク材の材質に制限がある。また、吊り鈎であれば、ブランク材に傷をつける虞れがある。この点、真空吸着カップであれば、ブランク材に傷をつける心配がなく且つブランク材の材質は問わないので、使い勝手が極めてよくなる。

【図面の簡単な説明】

【図１】本発明に係る超塑性成形装置の平面図

【図２】図１の２矢視図

【図３】本発明に係る投入兼取出し装置のアーム部材斜視図

【図４】図３の４－４線断面図

【図５】本発明で使用する超塑性成形金型の断面図

【図６】投入兼取出し装置の作用説明図（その１）

【図７】投入兼取出し装置の作用説明図（その２）

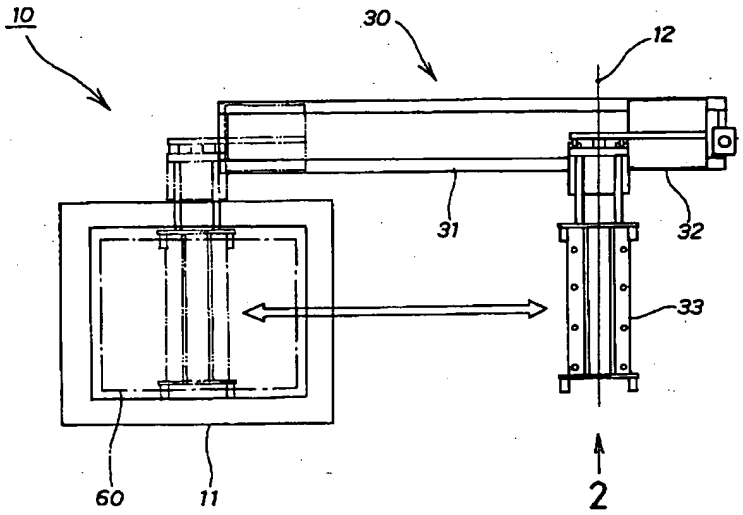
【図８】改良された従来の超塑性成形装置の構成図兼作用説明図

【図９】別の従来の超塑性成形装置の作用説明図

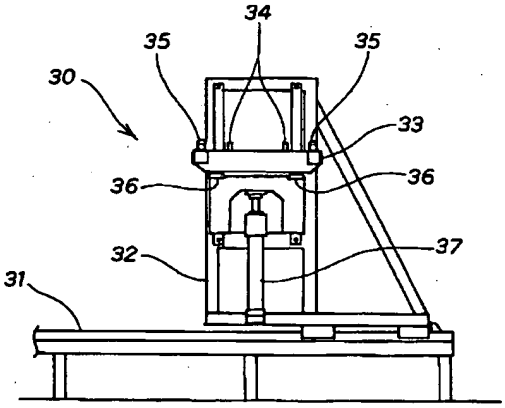
【符号の説明】

１０…超塑性成形装置、１２…待機位置、３０…超塑性成形用ブランク材の投入兼成形品の取出し装置（投入兼取出し装置）、３１…レール部材、３２…走行台車、３３…アーム部材、３４…吹出しノズル、３５…成形品載せ部、３６…ブランク材吊り機構としての真空吸着カップ、６０…超塑性成形金型（成形金型）、６１…成形面、６２…上型、６３…成形ガス吹込み口、６４…下型、６７…高圧ガス発生器、７１…ブランク材、７２…成形品。

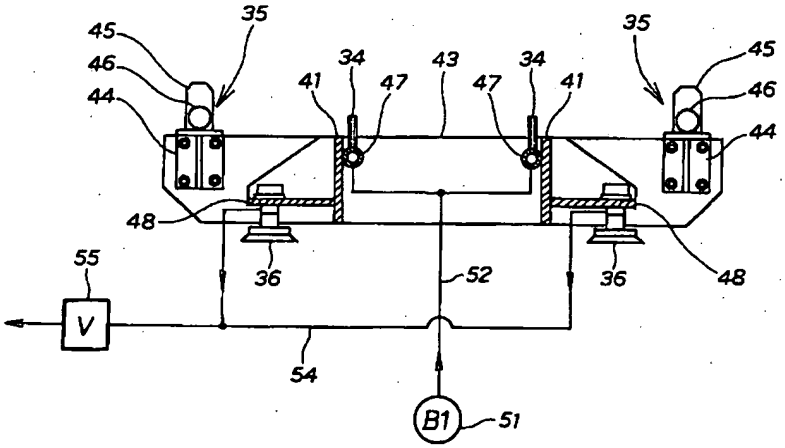
【図1】


10
30
12
31
32
33
60
11
2

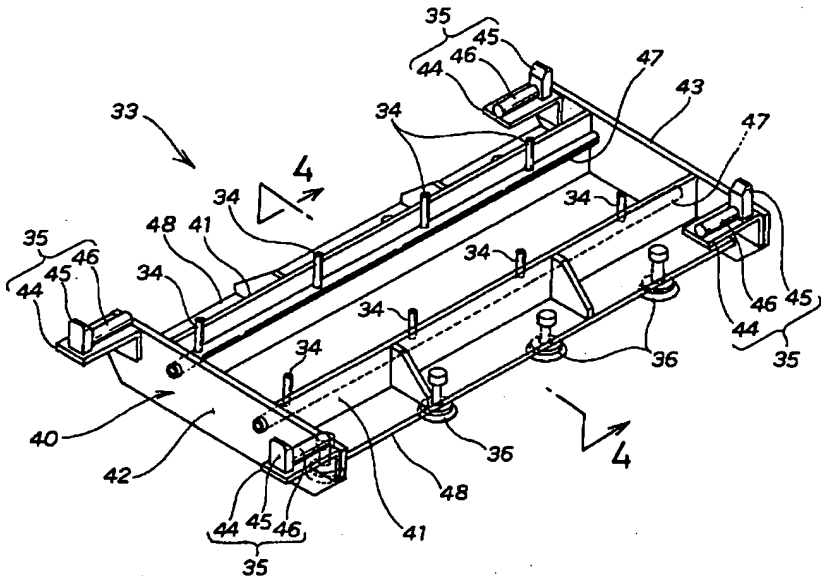
【図2】


34
35
35
30
33
36
36
32
37
31

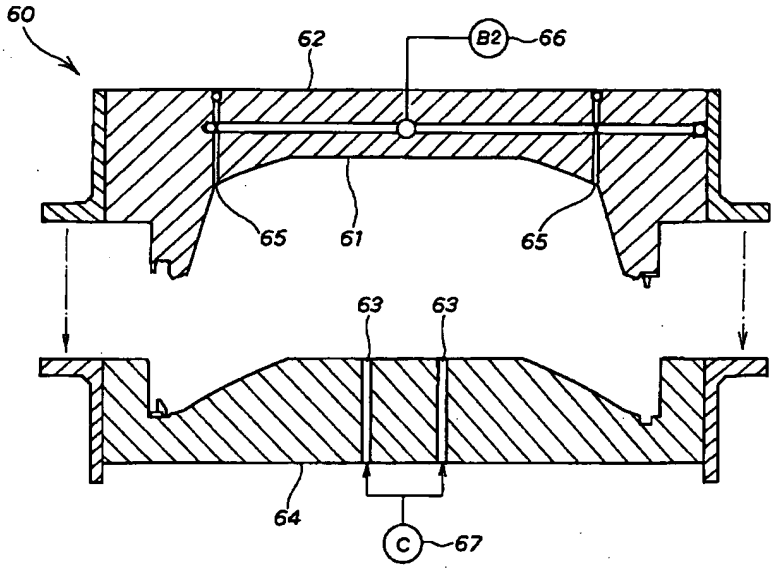
【図4】


35
45
46
44
34
41
47
43
47
34
41
35
45
46
44
48
36
52
36
48
55
V
54
B1
51

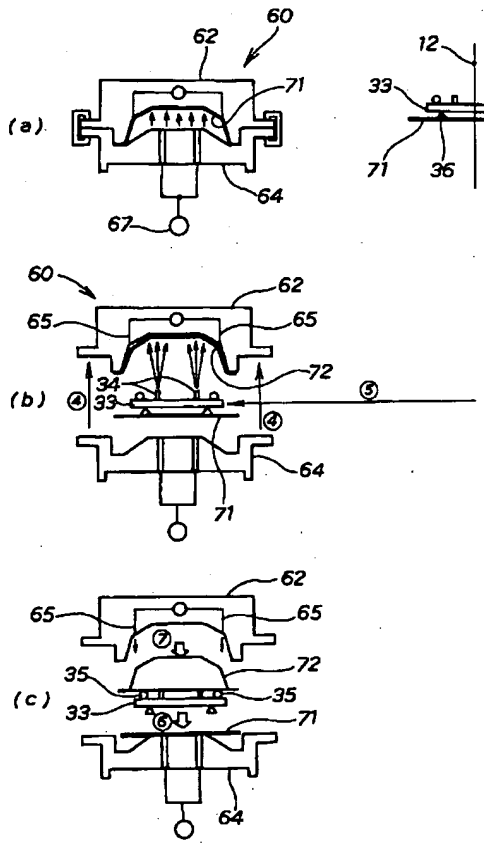
【図3】


35
45
46
44
47
43
33
34
4
48
41
40
42
36
48
41

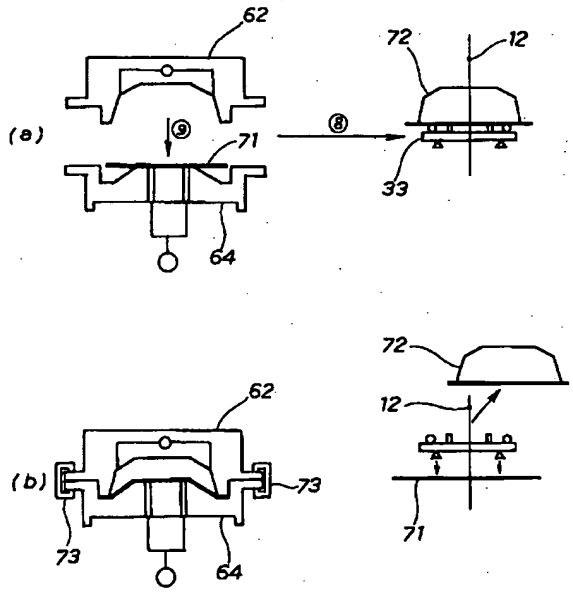
【図5】


60
62
B2
66
65
61
65
63
63
64
C
67

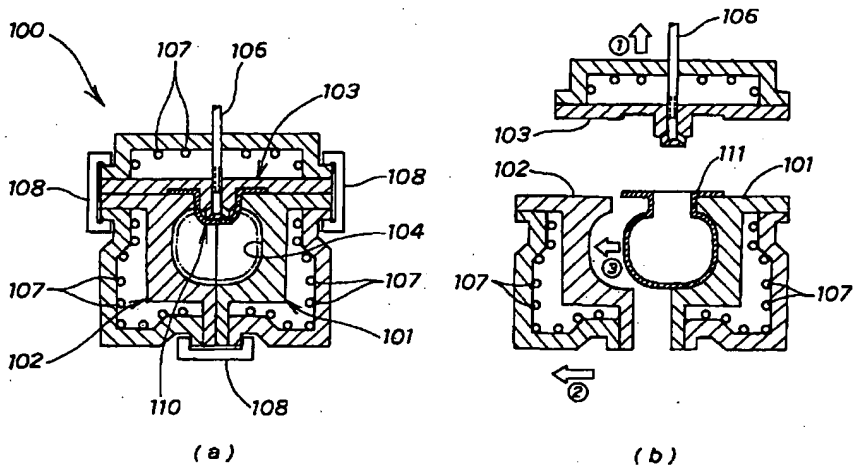
【図6】


(a)
(b)
(c)
60
62
71
64
67
12
33
36
65
72
34
35
73

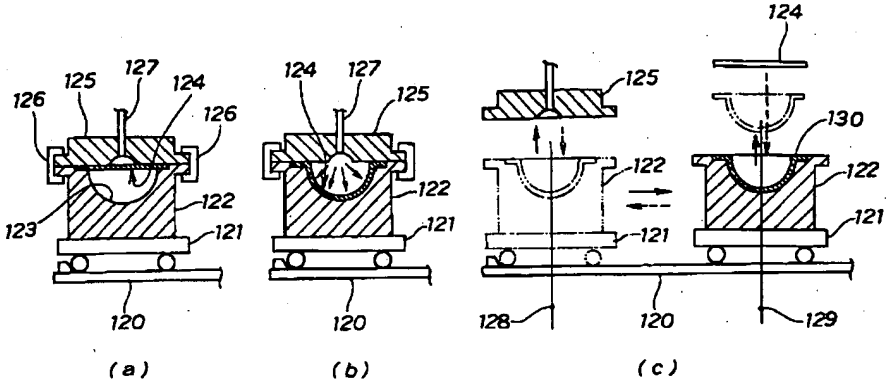
【図7】


(a)
(b)
62
72
12
71
64
33
73

【図8】


100
107
106
103
108
104
101
102
110
111
(a)
(b)

【図9】



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(54) **APPARATUS FOR CASTING BLANK FOR SUPERPLASTIC FORMING AND TAKING OUT MOLDING**

CLAIMS

[Claim(s)]

[Claim 1] the super-elasticity fabrication which consists of a punch which established the forming side characterized by to provide the following, and female mold equipped with the forming gas blowing-in mouth -- super-elasticity fabrication of the form which carries out blow molding of the blank material to a punch side by the pressure of the gas which inserted blank material into metal mold and was blown from the female-mold side -- the drawing equipment of an injection-cum-the mold goods of the blank material for super-elasticity fabrication which takes out mold goods while supplying blank material to metal mold this equipment -- super-elasticity fabrication -- the super-elasticity fabrication from the position in readiness established in the place distant from metal mold -- the run truck

to which even metal mold goes and comes back The arm member prepared in this run truck, the blow nozzle of the coolant gas prepared in the aforementioned arm member in order to cool the mold goods which got into the aforementioned forming side, mold-goods ****** prepared in the aforementioned arm member in order to carry mold goods, and the blank material **** mechanism prepared in the aforementioned arm member in order to hang blank material.

[Claim 2] The aforementioned blank material **** mechanism is drawing equipment of an injection-cum-the mold goods of the blank material for super-elasticity fabrication according to claim 1 characterized by being a vacuum adsorption cup.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention -- super-elasticity fabrication -- metal mold -- blank material -- supplying -- said -- it is related with the drawing equipment of an injection-cum-the mold goods of the blank material for super-elasticity fabrication which picks out super-elasticity mold goods from metal mold In addition, in this book, "*******" says what a punch is put for on female mold (or the mold of another side is put on one mold), and "eye a mold clamp" says binding molds tight by the clamp etc. so that a fluctuated type (or on the other hand mold of - another side) may not dissociate.

[0002]

[Description of the Prior Art] If plastic working is performed for a metallic material to the bottom of certain conditions, no less than 800 - 1000% of very big elongation can be made to appear. This phenomenon is called "super-elasticity" and it is explained that this super-elasticity is what is depended on a boundary-sliding phenomenon.

[0003] For example, compact equipment is indicated by JP,7-265966,A "super-elasticity fabrication equipment." The following drawing explains the outline of this equipment. In addition, the sign was newly reshaken. Drawing 8 (a) and (b) are operation [a block diagram-cum-] explanatory drawings of the improved conventional super-elasticity fabrication equipment. A form block 100 is a trichotomized type which consists of lower right type 101, lower left type 102, and a punch 103, has a cavity 104 between lower right type 101 and lower left type 102, and has a feed pipe 106 in a punch 103 as shown in (a). 107 ... (... shows plurality.) the following -- the same . a heater and 108 ... is a clamp and the metal plate 110 which preformed -- the inside of a mold -- confining -- a heater 107 -- while warming by ... to predetermined temperature, as a fictitious outline shows by the pressure of the gas blown from the feed pipe 106, it swells That is, blow molding is carried out.

[0004] In (b), a punch 103 is raised as arrow **, by moving lower left type 102 as arrow ** to the left, a mold aperture is carried out and mold goods 111 are taken out as arrow **.

[0005] However, the next technical problem occurs with the conventional super-elasticity fabrication equipment with which the **** was improved. As a result of carrying out horizontal movement of lower left type 102, it is rapidly cooled with the atmosphere and lower right type 101 and lower left type 102 become low temperature as arrow **. Consequently, much heat energy is needed for warming lower right type 101 and lower left type 102 by the next blow molding to predetermined temperature, and a technical problem remains in respect of a deployment of energy. Furthermore, since female mold was divided into right and left, mold structure becomes complicated and a mold manufacturing cost increases.

[0006] It is good if female mold is not divided into right and left in order to reduce a mold manufacturing cost. The example which carries out plastic working only with a fluctuated type is explained below. Drawing 9 (a) - (c) is operation explanatory drawing of another conventional super-elasticity fabrication equipment.

(a): ****** so that may put female mold 122 on the run truck 121 which runs a rail 120 top, the forming crevice 123 may be formed in this female mold 122, the blank material 124 may be put on this forming concave surface 123 and a punch 125 may be put from on the. 126,126 is a clamp.

(b): Blow a high-pressure fluid, for example, the compressed air, downward from the pressurization pipe 127. The configuration of a request of the blank material 124 is hollowed by the pressure of this fluid.

[0007] (c): Call 128 forming position and call 129 position in readiness. A punch 125 is raised after fabrication and, next, female mold 122 is moved to the position in readiness 129 of **** in an operation of the run truck 121 in the forming position 128. Mold goods 130 are taken out from female mold 122 in a position in readiness 129. Next, the new blank material 124 is put on female mold 122, this female mold 122 is returned, the position 128, i.e., the forming position, of a fictitious outline, and it prepares for the next blow molding.

[0008]
[Problem(s) to be Solved by the Invention] However, in order to pull out female mold 122 from the forming position 128 to a position in readiness 129 in the super-elasticity fabrication equipment of drawing 9 , while movement of female mold 122 takes time and productivity becomes low, female mold 122 will get cold. Therefore, loss of heat energy is not escaped.
[0009] By the way, if mold goods 130 are low temperature in taking out mold goods 130, the handling of mold goods 130 will become easy. Simultaneously, it becomes easy to release mold goods 130 from mold by cooling female mold 122 and mold goods 130 from female mold 122. Therefore, cooling mold goods 130 and female mold 122 conventionally has a meaning. However, cooling to this appearance will cause the fall of productivity, and loss of heat energy, and economical loss is not escaped with this. Then, the purpose of this invention is to offer the technology which can raise productivity while being able to suppress loss of heat energy.
[0010]
[Means for Solving the Problem] Blank material is inserted into metal mold. the super-elasticity fabrication which consists of a punch in which the claim 1 established the forming side in order to attain the above-mentioned purpose, and female mold equipped with the forming gas blowing-in mouth -- super-elasticity fabrication of the form which carries out blow molding of the blank material to a punch side by the pressure of the gas blown from the female mold side -- to metal mold It is drawing equipment of an injection-cum-the mold goods of the blank material for super-elasticity fabrication which takes out mold goods while supplying blank material. this equipment super-elasticity fabrication -- the super-elasticity fabrication from the position in readiness established in the place distant from metal mold -- with the run truck to which even metal mold goes and comes back The arm member attached in this run truck possible [rise and fall], and the blow nozzle of the coolant gas prepared in the aforementioned arm member in order to cool the mold goods which got into the forming side, It is characterized by mold-goods ****** prepared in the arm member in order to carry mold goods, the blank material **** mechanism prepared in the arm member in order to hang blank material, and the shell bird clapper.
[0011] A punch is raised after fabrication and an arm member is inserted into the bottom of it. To the arm member, blank material is hung beforehand, and this blank material is supplied to female mold. On the other hand, it blows off to the mold goods in the state where it stuck to the punch, and coolant gas is sprayed from a nozzle. Since it contracts with forced cooling, it dissociates from a punch, and mold goods fall to an arm member. carrying out horizontal movement of the arm member to a position in readiness -- metal mold -- mold goods are taken out outside Henceforth, what is necessary is to put a punch on female mold and just to carry out the next blow molding.
[0012] The blank material **** mechanism was used as the vacuum adsorption cup in the claim 2. A blank material **** mechanism has a limit in a magnetic adsorption magnet or the quality of the material of blank material which non-magnetic material cannot lift but can be dealt with if it is a magnet, although it may hang and ** is sufficient. Moreover, there is a possibility of hanging, and giving a blemish to blank material if it is **. If it is this point and a vacuum adsorption cup, since there will be no fear of giving a blemish to blank material and the quality of the material of blank material will not be asked, user-friendliness becomes very good.
[0013]
[Embodiments of the Invention] The gestalt of operation of this invention is explained below based on an attached drawing. In addition, a drawing shall be seen to the sense of a sign. Moreover, "an injection" says supplying blank material to metal mold, and that "drawing" picks out mold goods from metal mold during the following explanation. Drawing 1 is the plan of the super-elasticity fabrication equipment concerning this invention. super-elasticity fabrication equipment 10 the super-elasticity fabrication shown with a fictitious outline -- metal mold 60 and this fabrication -- with the heating furnace 11 surrounding metal mold 60 the rail extended to the position in readiness 12 prepared out of this heating furnace 11 -- with a member 31 this rail -- a member 31 top -- the fabrication from a position in readiness 12 -- the arm prepared in the run truck 32 in which even metal mold 60 carries out both-way movement, and this run truck 32 -- the drawing equipment 30 (it is hereafter written as "drawing [an injection-cum-] equipment 30".) of an injection-cum-the mold goods of the blank material for super-elasticity fabrication which made the member 33 the subject since -- it becomes This drawing [an injection-cum-] equipment 30 is explained in detail below.
[0014] drawing 2 -- 2 view view of drawing 1 -- it is -- drawing [an injection-cum-] equipment 30 -- a rail -- the arm attached in the run truck 32 which moves in a member 31 top, and this run truck 32 possible [rise and fall] -- although the following drawing explains a member 33 in detail -- an arm -- it hangs blank and becomes the blow nozzles 34 and 34 of the coolant gas prepared in the member 33, and mold-goods ****** 35 and 35 which carries mold goods from the vacuum adsorption cups 36 and 36 as 37 -- a rise-and-fall cylinder -- it is -- an operation of this rise-and-fall cylinder 37 -- the aforementioned arm -- a member 33 can be taken up and down arbitrarily
[0015] A member 33 uses as a primary member the parallel crosses 40 which come to pass two longitudinal beams

41 and 41 the cloth beams 42 and 43 of order. the arm of the drawing [an injection-cum-] equipment which drawing 3 requires for this invention -- a member -- a perspective diagram -- it is -- an arm -- the cloth beams 42 and 43 of these parallel crosses 40 -- the angle bracket 44 ... ... (a total of 4 sets) is attached. a guide plate 45 -- the receptacle seat 46 of the shape of ... and a pillar -- mold-goods ****** 35 which consists of ... It is made to put on ... the mold goods under descent (not shown) -- a guide plate 45 -- while guiding by ... receiving -- a seat 46 -- Moreover, make it crawl on the gas pipes 47 and 47 in accordance with a longitudinal beam 41 and 41 insides. from these gas pipes 47 and 47 -- blowing off -- a nozzle 34 -- the flanges 48 and 48 which enabled it to blow off gas upwards by branching ..., and were made to meet a longitudinal beam 41 and 41 superficies further again -- the vacuum adsorption cup 36 -- it is the thing of structure which hung ... In addition, parallel crosses 40 have comparatively [lightweight] large flexural rigidity. then, an arm -- lightweight-ization of a member 33 can be attained

[0016] Drawing 4 is the 4-4 line cross section of drawing 3 . The attaching position of a cloth beam 43, the receptacle seats 46 and 46, longitudinal beams 41 and 41, the gas pipes 47 and 47, the blow nozzles 34 and 34, flanges 48 and 48, and the vacuum adsorption cups 36 and 36, While especially the height relation was shown, the air for cooling generated in 1st Blois 51 is blown off through a pipe 52 and the gas pipes 47 and 47, and it was made to blow off from nozzles 34 and 34. and a pipe 54 and the vacuum generator 55 -- the vacuum adsorption cup 36 -- having maintained ... at the vacuum is shown A general-purpose vacuum pump or a cheap ejector mechanism is suitable for the vacuum generator 55.

[0017] the super-elasticity fabrication which uses drawing 5 by this invention -- the cross section of metal mold -- it is -- this fabrication -- metal mold 60 It consists of a punch 62 equipped with the forming side 61, and female mold 64 equipped with the forming gas blowing-in mouths 63 and 63. While cooling mold goods further to a punch 62, it has the air blow paths 65 and 65 which make the operation which makes mold goods release from mold, and air is sent to the air blow paths 65 and 65 in 2nd Blois 66, and a high pressure gas is sent to the forming gas blowing-in mouths 63 and 63 by the high-pressure-gas generator 67. You may be a chemical cylinder although an air compressor is suitable for the high-pressure-gas generator 67.

[0018] An operation of the drawing [an injection-cum-] equipment described above is explained using drawing 6 and 7. Drawing 6 (a) - (c) is operation explanatory drawing (the 1) of drawing [an injection-cum-] equipment. fabrication of **** of (a) -- with metal mold 60, the blank material 71 is bulged to a punch 62 side by the pressure of the gas blown from the female mold 64 side -- making -- moreover -- the position in readiness 12 of **** -- an arm -- signs that the following blank material 71 is hung from the vacuum adsorption cups 36 and 36 to the member 33 are shown

[0019] if fabrication is completed -- immediately -- (b) -- setting -- the passage of arrow ** -- a punch 62 -- raising -- the passage of arrow ** -- an arm -- a member 33 -- fabrication -- it is made to advance into metal mold 60, and the blank material 71 is dropped to female mold 64 (arrow [of the following drawing (c)] **) On the other hand, mold goods 72 have stuck to the punch 62. Then, the air as coolant gas is sprayed on the undersurface of mold goods 72 from the blow nozzles 34 and 34. Air is sprayed on the upper surface of mold goods 72 from the air blow paths 65 and 65 in a punch 62 almost simultaneously simultaneous.

[0020] In (c), the blank material 71 is put on female mold 64 as stated previously, and on the other hand, mold goods 72 are cooled. then, the mold goods 72 -- being shrunken -- from a punch 62 -- separating -- being easy -- the air blow from the air blow paths 65 and 65 in a punch 62 -- the inside of a short time -- mold goods 72 -- from a punch 62 -- separating -- falling -- an arm -- it appears in mold-goods ****** 35 and 35 of a member 33 (arrow **)

[0021] Drawing 7 (a) and (b) are operation explanatory drawings (the 2) of drawing [an injection-cum-] equipment. (a) -- setting -- an arm -- a member 33 is moved as arrow ** to a position in readiness 12 Next, a punch 62 is lowered as arrow ** and a contagion is carried out. In (b), blow molding is started, after mold-clamp carrying out by clamps 73 and 73. On the other hand, the new blank material 71 is made to adsorb in a position in readiness 12, removing mold goods 72 with the means or help who does not illustrate. Now, it returns to drawing 6 (a) and 1 cycle is completed. in addition -- although explanation was omitted -- the aforementioned arm -- making a member 33 go up and down suitably does not interfere

[0022] Since forced cooling of the mold goods 72 is carried out and mold release was urged so that clearly from drawing 6 and 7, before a punch 62 and female mold 64 get cold, the next blow molding can be started. Consequently, while being able to suppress loss of heat energy, the duration of 1 cycle can be shortened, and productivity can be raised.

[0023] in addition, the claim 1 -- setting -- a blank material **** mechanism -- hanging -- a magnet (lifting magnet) -- it may hang and you may be ** However, if it is a vacuum adsorption cup, there will also be no possibility of both the magnetic substance and non-magnetic material being lifted, and giving a blemish to blank material. Moreover, although female mold is made to stand it still and it went up and down the punch in the example, a punch is made to stand it still conversely and you may make it go up and down female mold.

[0024]
[Effect of the Invention] this invention demonstrates the following effect by the above-mentioned composition. The claim 1 could start the next blow molding, before metal mold got cold, while being characterized by making it make the mold goods which have stuck to having received the mold goods which fall from a punch by the same arm member while hanging blank material by the arm member and supplying to female mold, and the punch release from mold quickly by carrying out forced cooling by coolant gas, consequently being able to shorten the cycle time.
[0025] That is, since the cycle time can be easily shortened while being able to start the next blow molding and being able to suppress loss of heat energy by carrying out injection and drawing quickly before metal mold gets cold since blank material is supplied to metal mold by the arm member and mold goods were picked out from metal mold by the arm member, productivity can greatly be raised.
[0026] The blank material **** mechanism was used as the vacuum adsorption cup in the claim 2. A blank material **** mechanism has a limit in a magnetic adsorption magnet or the quality of the material of blank material which non-magnetic material cannot lift but can be dealt with if it is a magnet, although it may hang and ** is sufficient. Moreover, there is a possibility of hanging, and giving a blemish to blank material if it is **. If it is this point and a vacuum adsorption cup, since there will be no fear of giving a blemish to blank material and the quality of the material of blank material will not be asked, user-friendliness becomes very good.

TECHNICAL FIELD

[The technical field to which invention belongs] this invention -- super-elasticity fabrication -- metal mold -- blank material -- supplying -- said -- it is related with the drawing equipment of an injection-cum-the mold goods of the blank material for super-elasticity fabrication which picks out super-elasticity mold goods from metal mold In addition, in this book, "*******" says what a punch is put for on female mold (or the mold of another side is put on one mold), and "eye a mold clamp" says binding molds tight by the clamp etc. so that a fluctuated type (or on the other hand mold of - another side) may not dissociate.

PRIOR ART

[Description of the Prior Art] If plastic working is performed for a metallic material to the bottom of certain conditions, no less than 800 - 1000% of very big elongation can be made to appear. This phenomenon is called "super-elasticity" and it is explained that this super-elasticity is what is depended on a boundary-sliding phenomenon.
[0003] For example, compact equipment is indicated by JP,7-265966,A "super-elasticity fabrication equipment." The following drawing explains the outline of this equipment. In addition, the sign was newly reshaken. Drawing 8 (a) and (b) are operation [a block diagram-cum-] explanatory drawings of the improved conventional super-elasticity fabrication equipment. A form block 100 is a trichotomized type which consists of lower right type 101, lower left type 102, and a punch 103, has a cavity 104 between lower right type 101 and lower left type 102, and has a feed pipe 106 in a punch 103 as shown in (a). 107 ... (... shows plurality.) the following -- the same . a heater and 108 ... is a clamp and the metal plate 110 which preformed -- the inside of a mold -- confining -- a heater 107 -- while warming by ... to predetermined temperature, as a fictitious outline shows by the pressure of the gas blown from the feed pipe 106, it swells That is, blow molding is carried out.
[0004] In (b), a punch 103 is raised as arrow **, by moving lower left type 102 as arrow ** to the left, a mold aperture is carried out and mold goods 111 are taken out as arrow **.
[0005] However, the next technical problem occurs with the conventional super-elasticity fabrication equipment with which the **** was improved. As a result of carrying out horizontal movement of lower left type 102, it is rapidly cooled with the atmosphere and lower right type 101 and lower left type 102 become low temperature as arrow **. Consequently, much heat energy is needed for warming lower right type 101 and lower left type 102 by the next blow molding to predetermined temperature, and a technical problem remains in respect of a deployment of energy. Furthermore, since female mold was divided into right and left, mold structure becomes complicated and a mold manufacturing cost increases.
[0006] It is good if female mold is not divided into right and left in order to reduce a mold manufacturing cost. The example which carries out plastic working only with a fluctuated type is explained below. Drawing 9 (a) - (c) is

operation explanatory drawing of another conventional super-elasticity fabrication equipment.
(a): ****** so that may put female mold 122 on the run truck 121 which runs a rail 120 top, the forming crevice 123 may be formed in this female mold 122, the blank material 124 may be put on this forming concave surface 123 and a punch 125 may be put from on the. 126,126 is a clamp.
(b): Blow a high-pressure fluid, for example, the compressed air, downward from the pressurization pipe 127. The configuration of a request of the blank material 124 is hollowed by the pressure of this fluid.
[0007] (c): Call 128 forming position and call 129 position in readiness. A punch 125 is raised after fabrication and, next, female mold 122 is moved to the position in readiness 129 of **** in an operation of the run truck 121 in the forming position 128. Mold goods 130 are taken out from female mold 122 in a position in readiness 129. Next, the new blank material 124 is put on female mold 122, this female mold 122 is returned, the position 128, i.e., the forming position, of a fictitious outline, and it prepares for the next blow molding.

EFFECT OF THE INVENTION

[Effect of the Invention] this invention demonstrates the following effect by the above-mentioned composition. While a claim 1 hangs blank material by the arm member and supplies it to female mold While being characterized by making it make the mold goods which have stuck to having received the mold goods which fall from a punch by the same arm member, and the punch release from mold quickly by carrying out forced cooling by coolant gas, consequently being able to shorten the cycle time, before metal mold got cold, the next blow molding could be started.
[0025] That is, since the cycle time can be easily shortened while being able to start the next blow molding and being able to suppress loss of heat energy by carrying out injection and drawing quickly before metal mold gets cold since blank material is supplied to metal mold by the arm member and mold goods were picked out from metal mold by the arm member, productivity can greatly be raised.
[0026] The blank material **** mechanism was used as the vacuum adsorption cup in the claim 2. A blank material **** mechanism has a limit in a magnetic adsorption magnet or the quality of the material of blank material which non-magnetic material cannot lift but can be dealt with if it is a magnet, although it may hang and ** is sufficient. Moreover, there is a possibility of hanging, and giving a blemish to blank material if it is **. If it is this point and a vacuum adsorption cup, since there will be no fear of giving a blemish to blank material and the quality of the material of blank material will not be asked, user-friendliness becomes very good.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, in order to pull out female mold 122 from the forming position 128 to a position in readiness 129 in the super-elasticity fabrication equipment of drawing 9 , while movement of female mold 122 takes time and productivity becomes low, female mold 122 will get cold. Therefore, loss of heat energy is not escaped.
[0009] By the way, if mold goods 130 are low temperature in taking out mold goods 130, the handling of mold goods 130 will become easy. Simultaneously, it becomes easy to release mold goods 130 from mold by cooling female mold 122 and mold goods 130 from female mold 122. Therefore, cooling mold goods 130 and female mold 122 conventionally has a meaning. However, cooling to this appearance will cause the fall of productivity, and loss of heat energy, and economical loss is not escaped with this. Then, the purpose of this invention is to offer the technology which can raise productivity while being able to suppress loss of heat energy.

MEANS

[Means for Solving the Problem] Blank material is inserted into metal mold. the super-elasticity fabrication which consists of a punch in which the claim 1 established the forming side in order to attain the above-mentioned purpose,

and female mold equipped with the forming gas blowing-in mouth -- super-elasticity fabrication of the form which carries out blow molding of the blank material to a punch side by the pressure of the gas blown from the female mold side -- to metal mold It is drawing equipment of an injection-cum-the mold goods of the blank material for super-elasticity fabrication which takes out mold goods while supplying blank material. this equipment super-elasticity fabrication -- the super-elasticity fabrication from the position in readiness established in the place distant from metal mold -- with the run truck to which even metal mold goes and comes back The arm member attached in this run truck possible [rise and fall], and the blow nozzle of the coolant gas prepared in the aforementioned arm member in order to cool the mold goods which got into the forming side, It is characterized by mold-goods ****** prepared in the arm member in order to carry mold goods, the blank material **** mechanism prepared in the arm member in order to hang blank material, and the shell bird clapper..

[0011] A punch is raised after fabrication and an arm member is inserted into the bottom of it. To the arm member, blank material is hung beforehand, and this blank material is supplied to female mold. On the other hand, it blows off to the mold goods in the state where it stuck to the punch, and coolant gas is sprayed from a nozzle. Since it contracts with forced cooling, it dissociates from a punch, and mold goods fall to an arm member. carrying out horizontal movement of the arm member to a position in readiness -- metal mold -- mold goods are taken out outside Henceforth, what is necessary is to put a punch on female mold and just to carry out the next blow molding.

[0012] The blank material **** mechanism was used as the vacuum adsorption cup in the claim 2. A blank material **** mechanism has a limit in a magnetic adsorption magnet or the quality of the material of blank material which non-magnetic material cannot lift but can be dealt with if it is a magnet, although it may hang and ** is sufficient. Moreover, there is a possibility of hanging, and giving a blemish to blank material if it is **. If it is this point and a vacuum adsorption cup, since there will be no fear of giving a blemish to blank material and the quality of the material of blank material will not be asked, user-friendliness becomes very good.

[0013]

[Embodiments of the Invention] The gestalt of operation of this invention is explained below based on an attached drawing. In addition, a drawing shall be seen to the sense of a sign. Moreover, "an injection" says supplying blank material to metal mold, and that "drawing" picks out mold goods from metal mold during the following explanation. Drawing 1 is the plan of the super-elasticity fabrication equipment concerning this invention. super-elasticity fabrication equipment 10 the super-elasticity fabrication shown with a fictitious outline -- metal mold 60 and this fabrication -- with the heating furnace 11 surrounding metal mold 60 the rail extended to the position in readiness 12 prepared out of this heating furnace 11 -- with a member 31 this rail -- a member 31 top -- the fabrication from a position in readiness 12 -- the arm prepared in the run truck 32 in which even metal mold 60 carries out both-way movement, and this run truck 32 -- the drawing equipment 30 (it is hereafter written as "drawing [an injection-cum-] equipment 30".) of an injection-cum-the mold goods of the blank material for super-elasticity fabrication which made the member 33 the subject since -- it becomes This drawing [an injection-cum-] equipment 30 is explained in detail below.

[0014] drawing 2 -- 2 view view of drawing 1 -- it is -- drawing [an injection-cum-] equipment 30 -- a rail -- the arm attached in the run truck 32 which moves in a member 31 top, and this run truck 32 possible [rise and fall] -- although the following drawing explains a member 33 in detail -- an arm -- it hangs blank and becomes the blow nozzles 34 and 34 of the coolant gas prepared in the member 33, and mold-goods ****** 35 and 35 which carries mold goods from the vacuum adsorption cups 36 and 36 as 37 -- a rise-and-fall cylinder -- it is -- an operation of this rise-and-fall cylinder 37 -- the aforementioned arm -- a member 33 can be taken up and down arbitrarily

[0015] A member 33 uses as a primary member the parallel crosses 40 which come to pass two longitudinal beams 41 and 41 the cloth beams 42 and 43 of order. the arm of the drawing [an injection-cum-] equipment which drawing 3 requires for this invention -- a member -- a perspective diagram -- it is -- an arm -- the cloth beams 42 and 43 of these parallel crosses 40 -- the angle bracket 44 ... ... (a total of 4 sets) is attached. a guide plate 45 -- the receptacle seat 46 of the shape of ... and a pillar -- mold-goods ****** 35 which consists of ... It is made to put on ... the mold goods under descent (not shown) -- a guide plate 45 -- while guiding by ... receiving -- a seat 46 -- Moreover, make it crawl on the gas pipes 47 and 47 in accordance with a longitudinal beam 41 and 41 insides. from these gas pipes 47 and 47 -- blowing off -- a nozzle 34 -- the flanges 48 and 48 which enabled it to blow off gas upwards by branching ..., and were made to meet a longitudinal beam 41 and 41 superficies further again -- the vacuum adsorption cup 36 -- it is the thing of structure which hung ... In addition, parallel crosses 40 have comparatively [lightweight] large flexural rigidity. then, an arm -- lightweight-ization of a member 33 can be attained

[0016] Drawing 4 is the 4-4 line cross section of drawing 3 . The attaching position of a cloth beam 43, the receptacle seats 46 and 46, longitudinal beams 41 and 41, the gas pipes 47 and 47, the blow nozzles 34 and 34, flanges 48 and 48, and the vacuum adsorption cups 36 and 36, While especially the height relation was shown, the air for cooling generated in 1st Blois 51 is blown off through a pipe 52 and the gas pipes 47 and 47, and it was made

to blow off from nozzles 34 and 34. and a pipe 54 and the vacuum generator 55 -- the vacuum adsorption cup 36 -- having maintained ... at the vacuum is shown A general-purpose vacuum pump or a cheap ejector mechanism is suitable for the vacuum generator 55.

[0017] the super-elasticity fabrication which uses drawing 5 by this invention -- the cross section of metal mold -- it is -- this fabrication -- metal mold 60 It consists of a punch 62 equipped with the forming side 61, and female mold 64 equipped with the forming gas blowing-in mouths 63 and 63. While cooling mold goods further to a punch 62, it has the air blow paths 65 and 65 which make the operation which makes mold goods release from mold, and air is sent to the air blow paths 65 and 65 in 2nd Blois 66, and a high pressure gas is sent to the forming gas blowing-in mouths 63 and 63 by the high-pressure-gas generator 67. You may be a chemical cylinder although an air compressor is suitable for the high-pressure-gas generator 67.

[0018] An operation of the drawing [an injection-cum-] equipment described above is explained using drawing 6 and 7. Drawing 6 (a) - (c) is operation explanatory drawing (the 1) of drawing [an injection-cum-] equipment. fabrication of **** of (a) -- with metal mold 60, the blank material 71 is bulged to a punch 62 side by the pressure of the gas blown from the female mold 64 side -- making -- moreover -- the position in readiness 12 of **** -- an arm -- signs that the following blank material 71 is hung from the vacuum adsorption cups 36 and 36 to the member 33 are shown

[0019] if fabrication is completed -- immediately -- (b) -- setting -- the passage of arrow ** -- a punch 62 -- raising -- the passage of arrow ** -- an arm -- a member 33 -- fabrication -- it is made to advance into metal mold 60, and the blank material 71 is dropped to female mold 64 (arrow [of the following drawing (c)] **) On the other hand, mold goods 72 have stuck to the punch 62. Then, the air as coolant gas is sprayed on the inferior surface of tongue of mold goods 72 from the blow nozzles 34 and 34. Air is sprayed on the upper surface of mold goods 72 from the air blow paths 65 and 65 in a punch 62 almost simultaneously simultaneous.

[0020] In (c), the blank material 71 is put on female mold 64 as stated previously, and on the other hand, mold goods 72 are cooled. then, the mold goods 72 -- being shrunken -- from a punch 62 -- separating -- being easy -- the air blow from the air blow paths 65 and 65 in a punch 62 -- the inside of a short time -- mold goods 72 -- from a punch 62 -- separating -- falling -- an arm -- it appears in mold-goods ****** 35 and 35 of a member 33 (arrow **)

[0021] Drawing 7 (a) and (b) are operation explanatory drawings (the 2) of drawing [an injection-cum-] equipment. (a) -- setting -- an arm -- a member 33 is moved as arrow ** to a position in readiness 12 Next, a punch 62 is lowered as arrow ** and a contagion is carried out. In (b), blow molding is started, after mold-clamp carrying out by clamps 73 and 73. On the other hand, the new blank material 71 is made to adsorb in a position in readiness 12, removing mold goods 72 with the means or help who does not illustrate. Now, it returns to drawing 6 (a) and 1 cycle is completed. in addition -- although explanation was omitted -- the aforementioned arm -- making a member 33 go up and down suitably does not interfere

[0022] Since forced cooling of the mold goods 72 is carried out and mold release was urged so that clearly from drawing 6 and 7, before a punch 62 and female mold 64 get cold, the next blow molding can be started. Consequently, while being able to suppress loss of heat energy, the duration of 1 cycle can be shortened, and productivity can be raised.

[0023] in addition, the claim 1 -- setting -- a blank material **** mechanism -- hanging -- a magnet (lifting magnet) -- it may hang and you may be ** However, if it is a vacuum adsorption cup, there will also be no possibility of both the magnetic substance and non-magnetic material being lifted, and giving a blemish to blank material. Moreover, although female mold is made to stand it still and it went up and down the punch in the example, a punch is made to stand it still conversely and you may make it go up and down female mold.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The plan of the super-elasticity fabrication equipment concerning this invention

[Drawing 2] 2 view view of drawing 1

[Drawing 3] the arm of the drawing [an injection-cum-] equipment concerning this invention -- a member -- a perspective diagram

[Drawing 4] The 4-4 line cross section of drawing 3

[Drawing 5] the super-elasticity fabrication used by this invention -- the cross section of metal mold

[Drawing 6] Operation explanatory drawing of drawing [an injection-cum-] equipment (the 1)

[Drawing 7] Operation explanatory drawing of drawing [an injection-cum-] equipment (the 2)

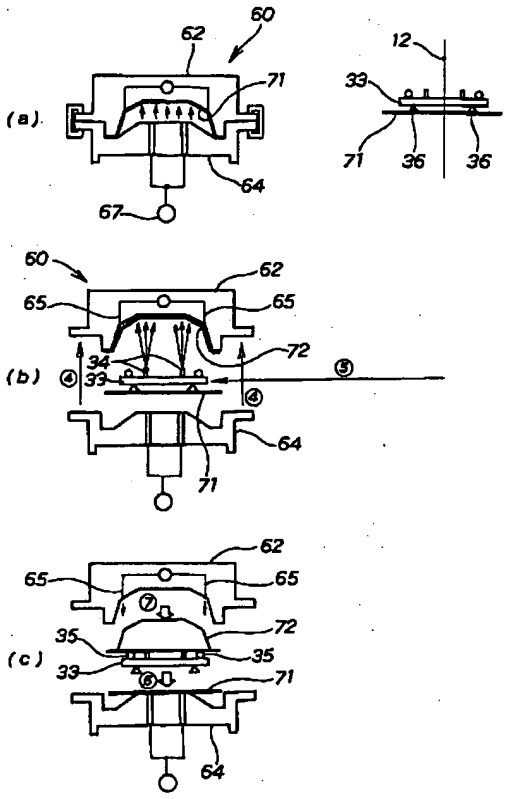
[Drawing 8] Operation [a block diagram-cum-] explanatory drawing of the improved conventional super-elasticity fabrication equipment

[Drawing 9] Operation explanatory drawing of another conventional super-elasticity fabrication equipment

[Description of Notations]

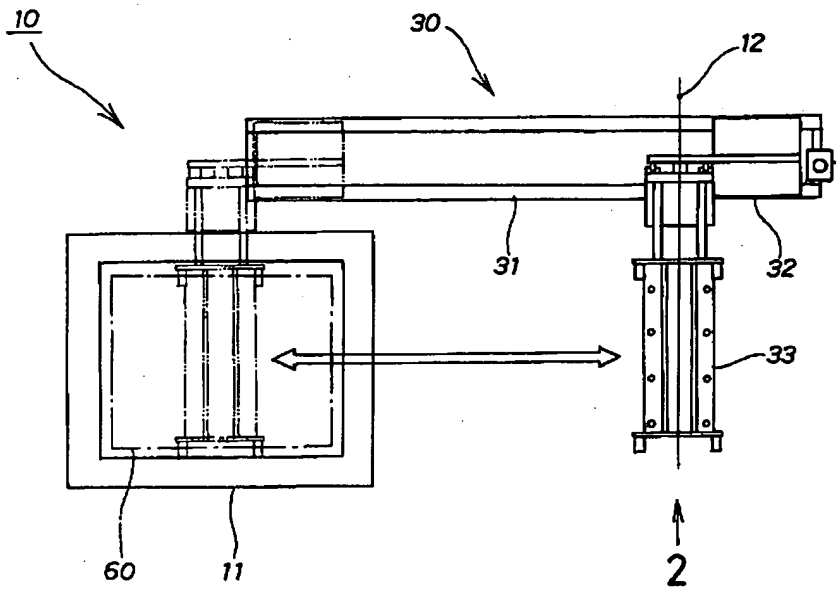
10 [-- Drawing equipment of an injection-cum-the mold goods of the blank material for super-elasticity fabrication (drawing / an injection-cum-/ equipment),] -- Super-elasticity fabrication equipment, 12 -- A position in readiness, 30 31 [-- An arm member, 34 / -- Blow nozzle,] -- A rail member, 32 -- A run truck, 33 35 -- mold-goods ******, the vacuum adsorption cup as a 36 -- blank material **** mechanism, and 60 -- super-elasticity fabrication -- metal mold (fabrication metal mold), 61 -- fabrication side, and 62 -- a punch, 63 -- fabrication gas blowing-in mouth, 64 -- female mold, and 67 -- a high-pressure-gas generator, 71 -- blank material, and 72 -- mold goods

Drawing selection [Representative drawing]



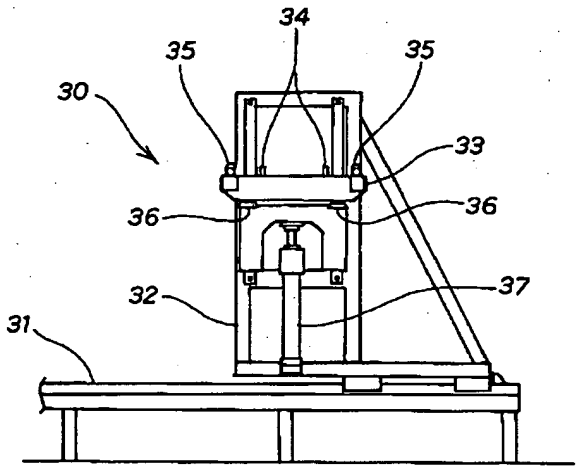
[Translation done.]

Drawing selection drawing 1



[Translation done.]

Drawing selection drawing 2



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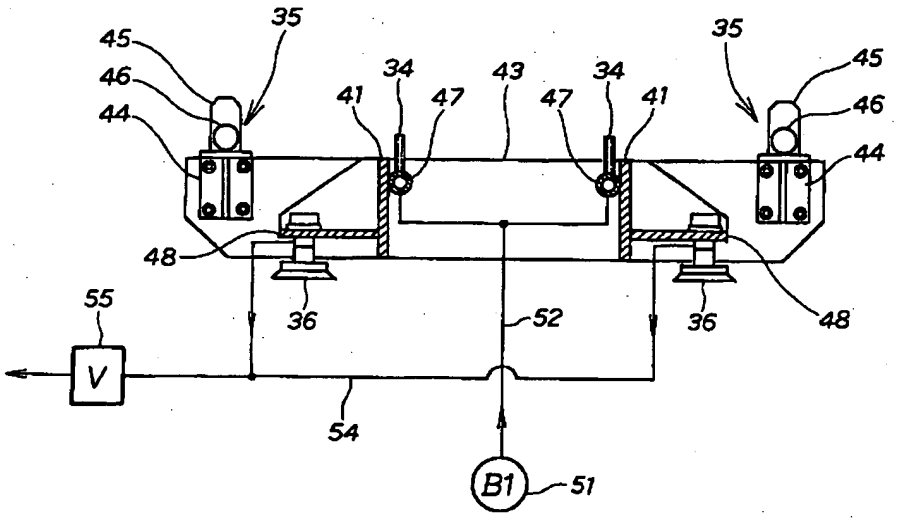
Drawing selection drawing 4



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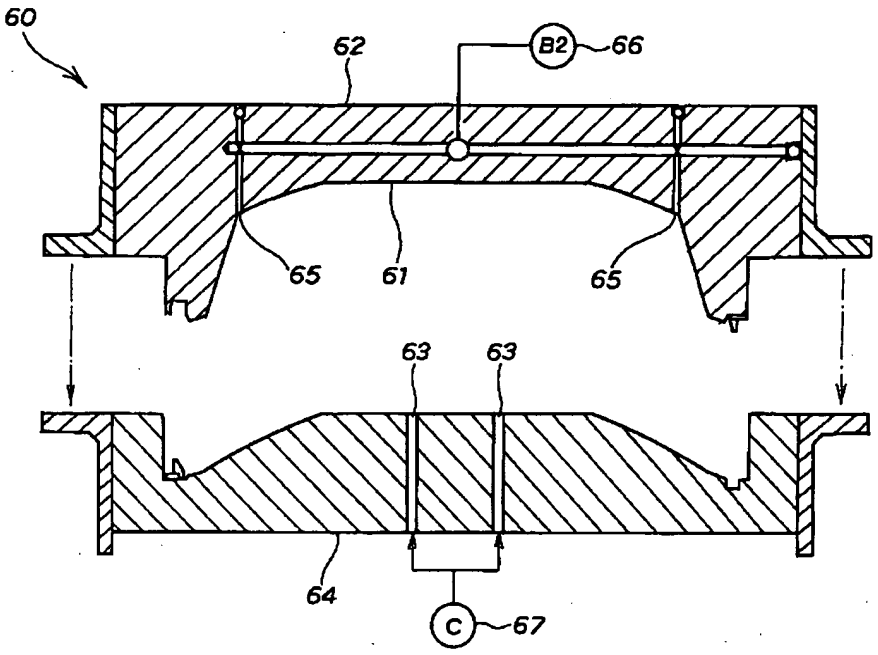
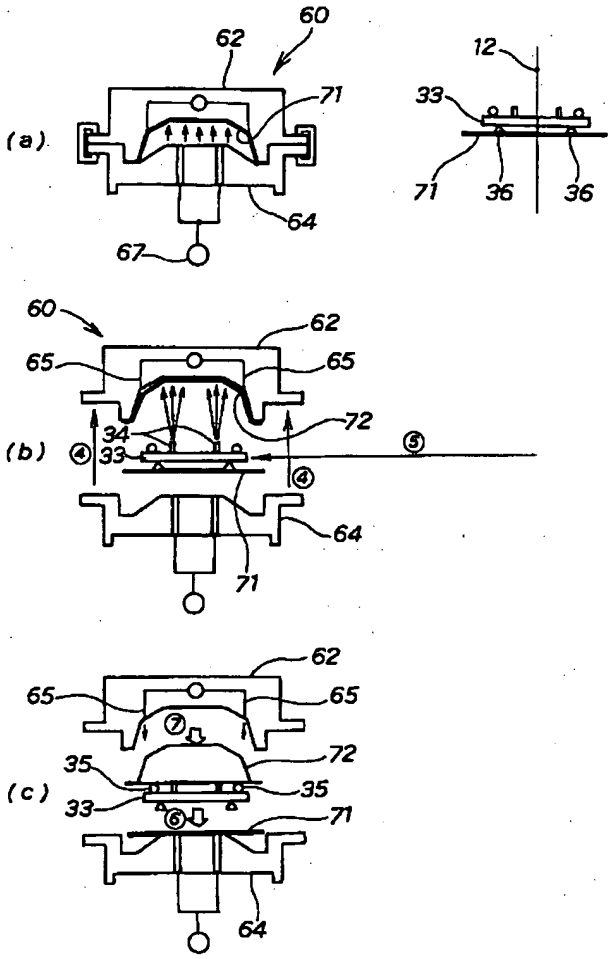
Drawing selection drawing 5



[Translation done.]

Drawing selection drawing 6



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